A Lecture on

Which is which? Research or Design?

...A focus on understanding the relationship between research and design

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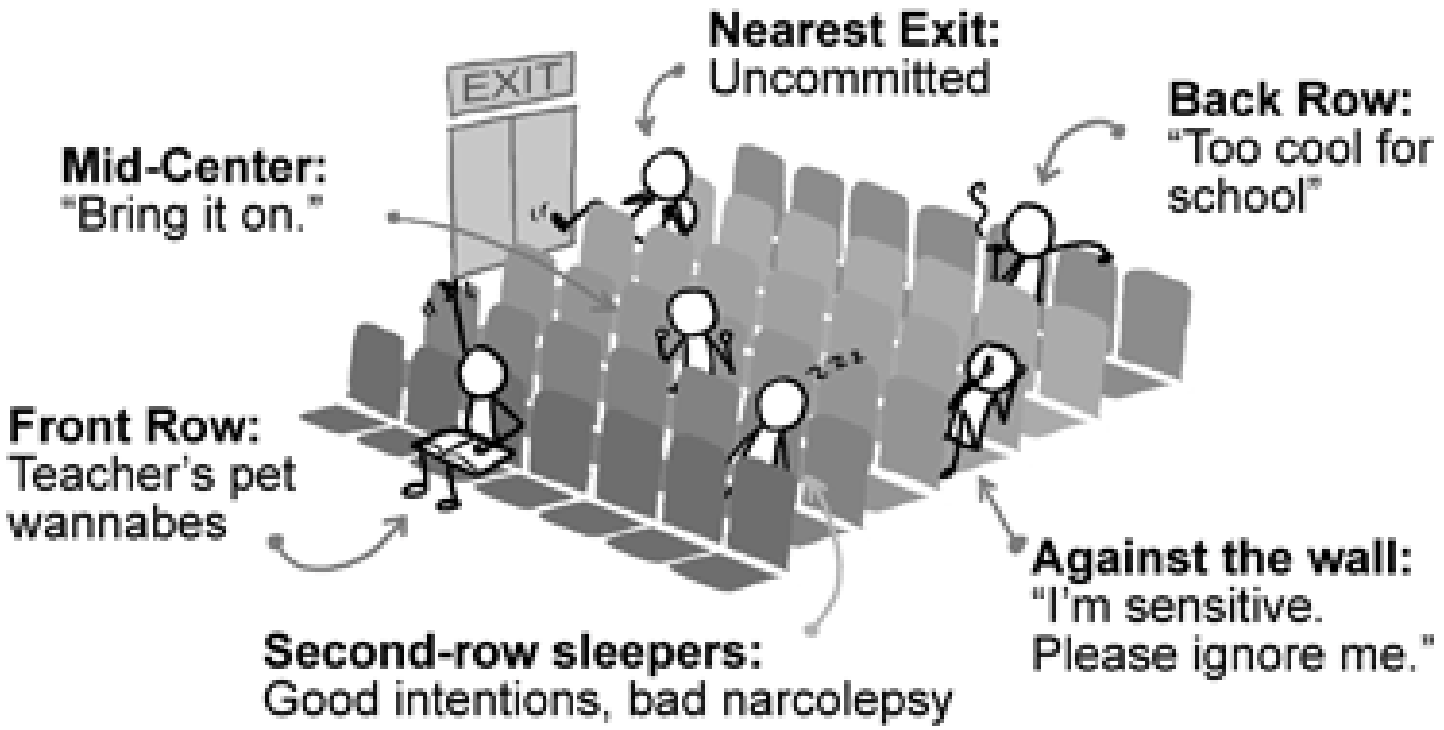
A Discussion Based on the Paper:
Faste, T., & Faste, H. (2012). *Demystifying "design research": Design is not research, research is design.* Paper presented at the IDSA Education Symposium.

WHERE YOU SIT IN CLASS/SEMINAR

And what it says about you:



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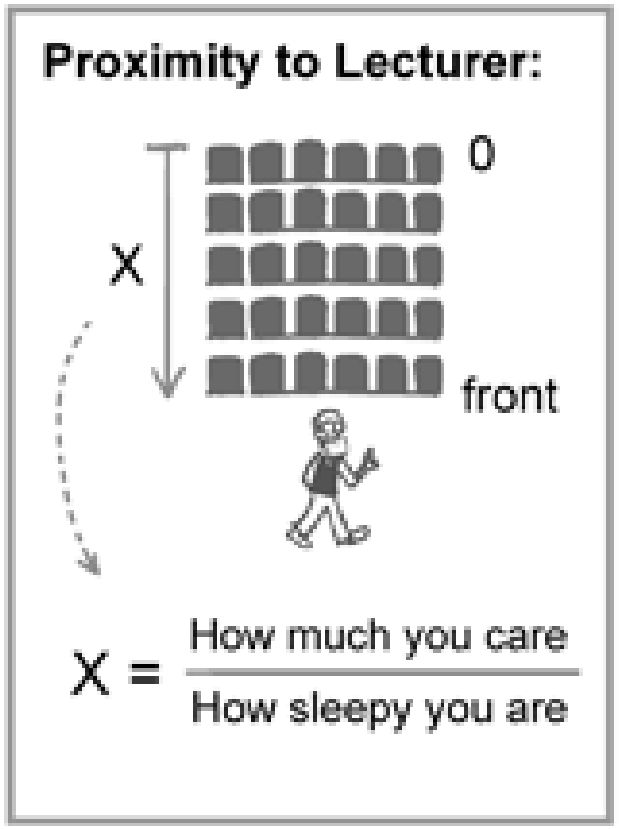


On What is what

...according to literature...

Design Research is...

Research

A systematic process of collecting, analyzing, and interpreting information –data– in order to increase our understanding of a phenomenon about which we are interested or concerned.[1]

Design

A plan for arranging elements in such a way as to best accomplish a particular purpose [2]

[1] **Ridley, D. (2008).** *The Literature Review: A Step-by-Step Guide for Students*: SAGE Publications.
[2] **Gash, S. (2000).** *Effective Literature Searching for Research*: Gower.

The Research Landscape

...categorizing research in between scientific and practice-based...

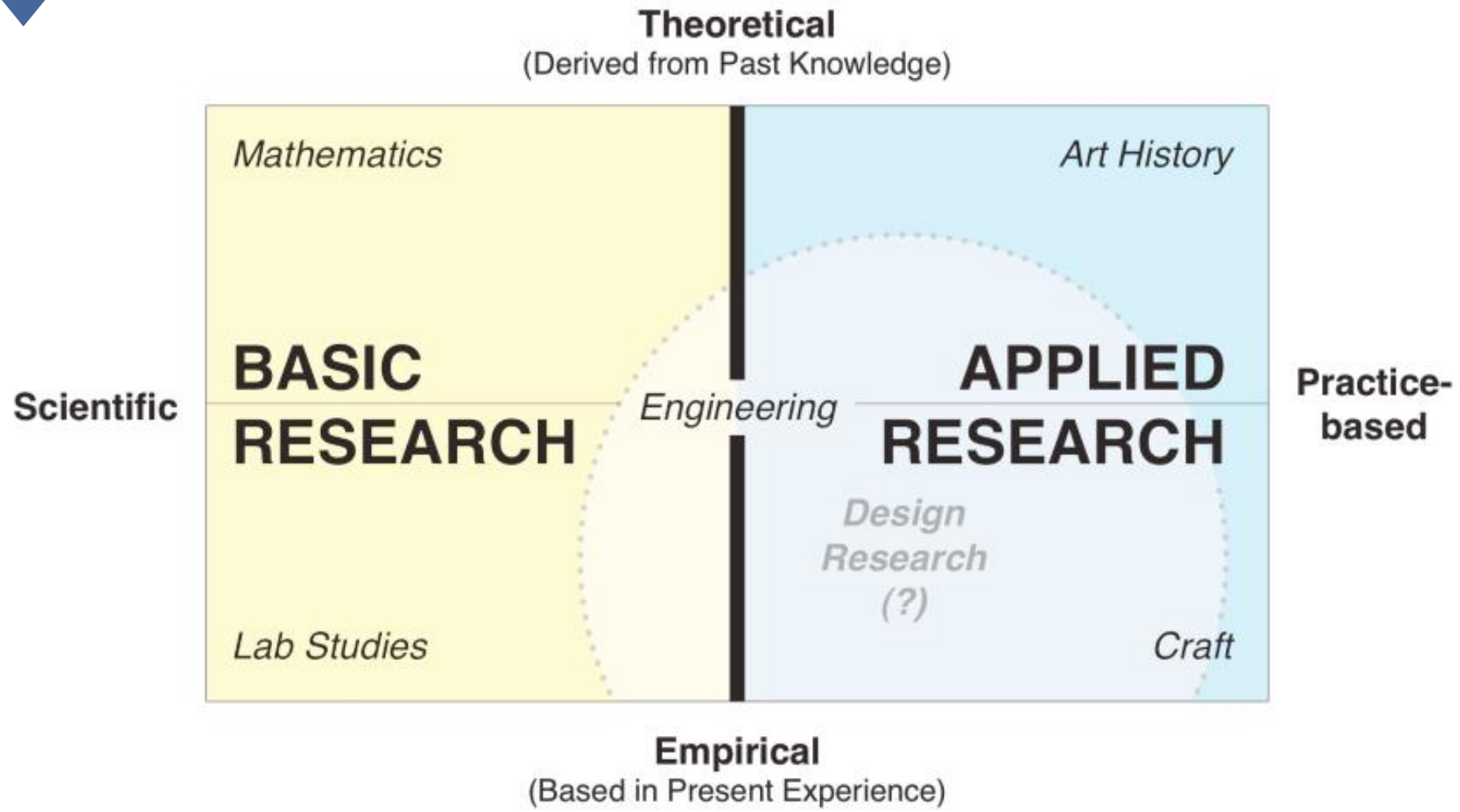


Figure 1. Kinds of Research

Distinction between the **new knowledge** created during the *"act of design"* and the *"study of design"*

Research is Design

...on why design is not research...

Suitable in the *context* of the **Engineering** discipline

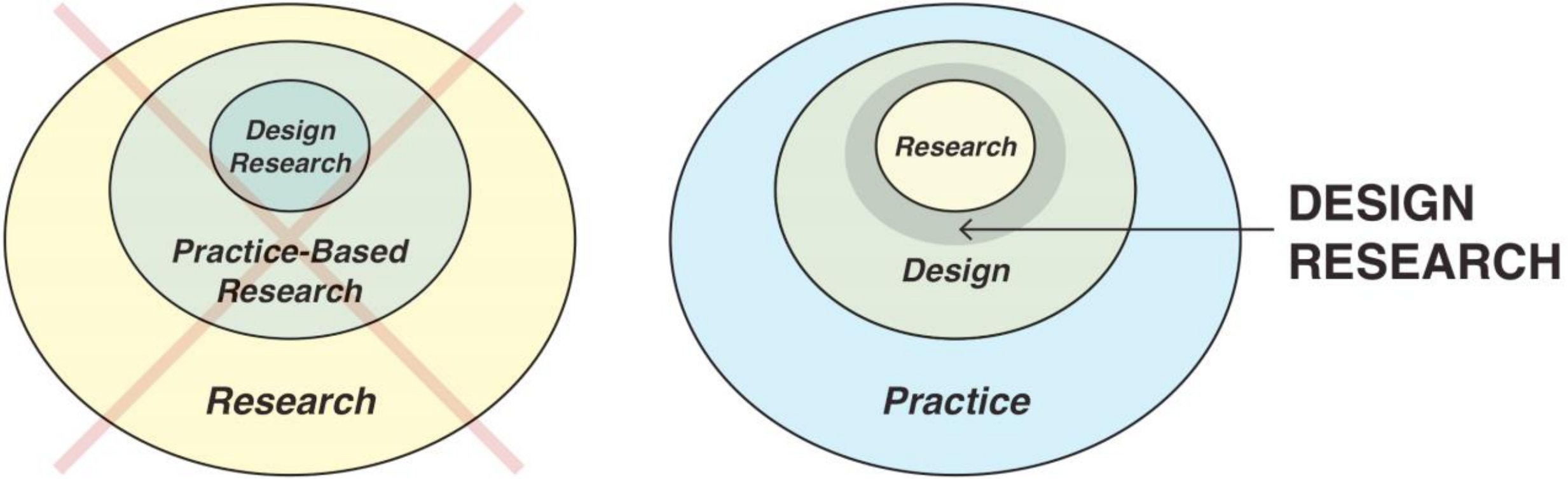


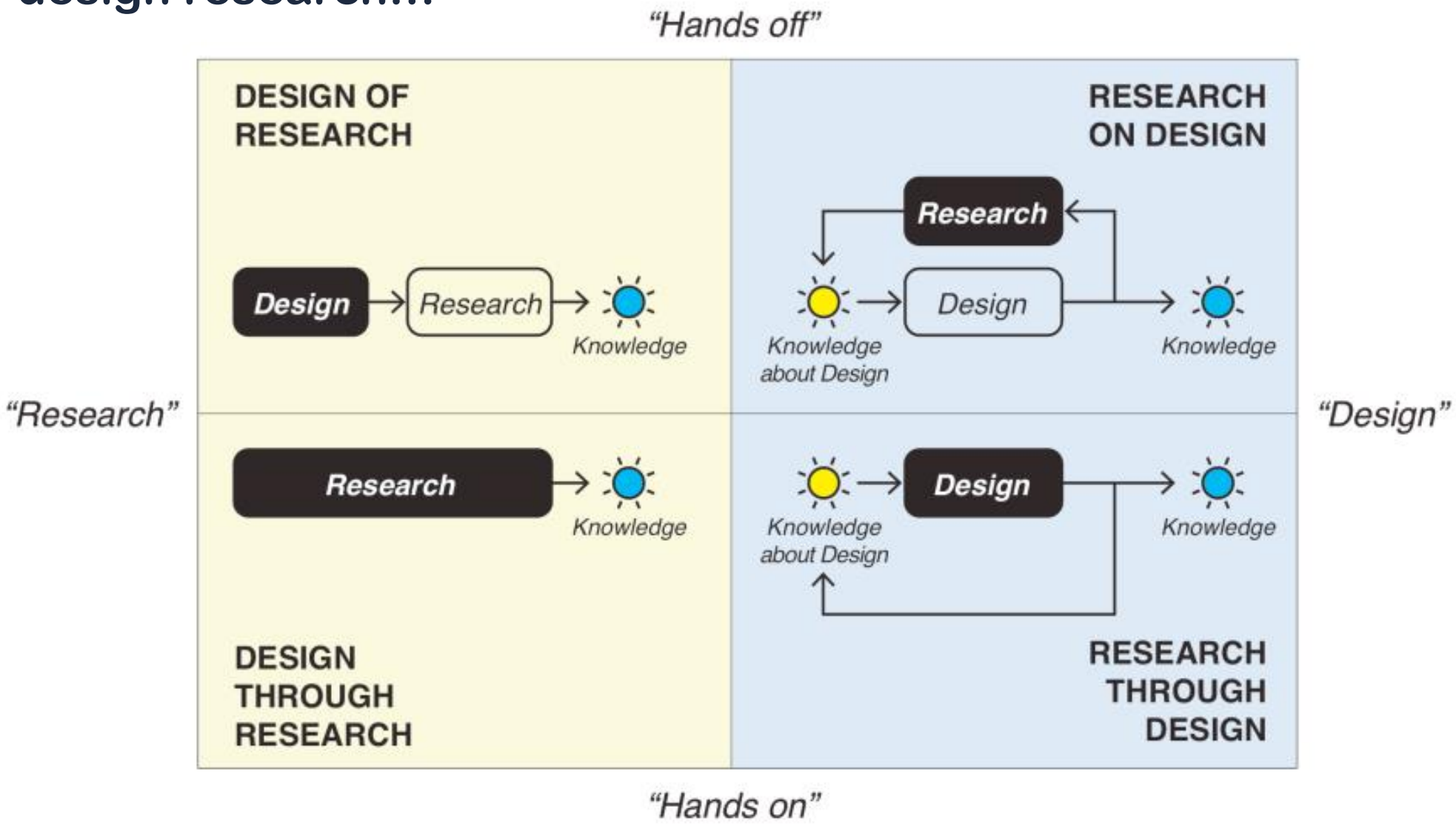
Figure 2. Design research is not a "kind" of research. Rather, research is a practice, and it is part of design practice.

Faste, T., & Faste, H. (2012). *Demystifying "design research": Design is not research, research is design.* Paper presented at the IDSA Education Symposium.

Research is Design

…taxonomy of design research…

Figure 3. Four categories of design research: **(1)** design through research, wherein researchers perform activities that would conventionally be considered "research"—regardless of their awareness that their activities are "design"; **(2)** design of research, the activities routinely performed by researchers to plan and evaluate their experimental designs; **(3)** research on design, wherein researchers study design practice at work, thereby revealing relevant process knowledge; and **(4)** research through design, wherein designers design things "as usual" but consider their results research because, in addition to shaping tangible outcomes, they have learned something new about their practice.



Which ‘Design Research’ activity is your research classified?

MARRIAGE vs. The Ph.D.

	Marriage	Ph.D.
Typical Length:	7.5 years	7 years
Begins with:	A proposal	A thesis proposal
Culminates in a ceremony where you walk down an aisle dressed in a gown:	✓	✓
Usually entered into by:	Foolish young people in love	Foolish young people without a job
50% end in:	Bitter divorce	Bitter remorse
Involves exchange of:	Vows	Know-how
Until death do you part?	If you're lucky	If you're lazy

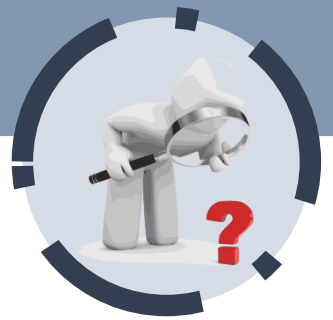
The ‘RESEARCH’ Problem

-the heart of the research process-

The ‘Research’ Problem

…on the method of inquiry…

look around



seek expert advice

what motivates you

read the literature

attend conferences

what peers find interesting

The Research Agenda

…on where “The Problem” is “THE PROBLEM”…

What is a Research Question?

…the definition…

A RESEARCH QUESTION IS

An interrogative sentence that states the **relationship** between two or more variables

Kerlinger, F. N. (1986). *Foundations of behavioral research*: Holt, Rinehart and Winston.

What is a Research Question?

…what makes the question a research question…

1. The variables in the problem should express a relationship

2. The problem should be stated in question form

3. The problem statement should be such as to imply possibilities of empirical testing

Kerlinger, F. N. (1986). *Foundations of behavioral research*: Holt, Rinehart and Winston.

What is a Research Question?

…how specific is the research question…

THE SPECIFICITY OF THE RESEARCH QUESTION

This refers to the preciseness with which the research question is stated to ensure that the researcher has a good grasp of the variables to be investigated and to aid the experimenter in designing and carrying out the experiment

If this is not met?

BREAK THE PROBLEM INTO PIECES

Christensen, L. B., Johnson, R. B., & Turner, L. A. (2015). *Research Methods, Design, and Analysis, Global Edition*: Pearson Education Limited.

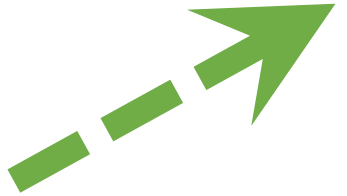
Asking the Research Question

…wondering why wondering why …

HOW

WHAT

GOAL/S



Effort & Time

Objective/s

WHY

WHEN

Objectives must be specific, measurable, and realistic such that it suggests possible **research design**

What is a Research Question?

...examples of general research questions...

Why?

Why did the wind turbine fail in 100km/h winds?

When?

When will the roof bolts in an underground tunnel fail through environmental degradation?

How?

How can the braking system of a railway carriage be self-activating when its velocity exceeds threshold value?

What?

What is the effect on the strength of concrete when recycled concrete is used in the mix?

Thiel, D. V. (2014). *Research Methods for Engineers*: Cambridge University Press.

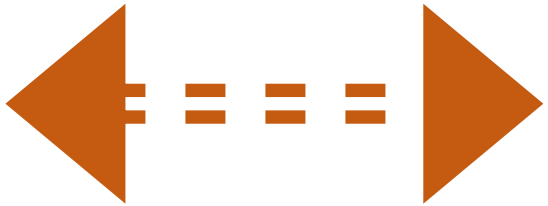
The Research Adviser

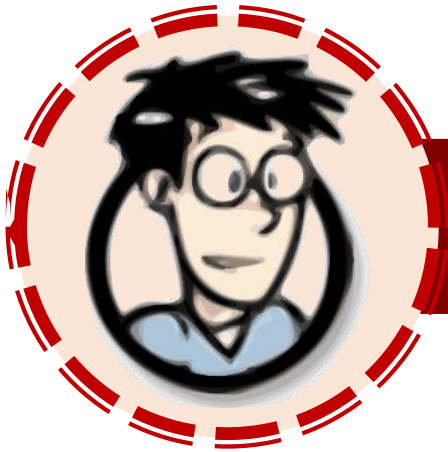
-the “ONE” that guides you in every step of the “WAY”-

The Research Adviser

…the “one” that shows you the ways of the “force”…

The Adviser





You

The Graduate Student

A Good Scientist

A Good Mentor

Well Motivated

Passionate

Highly Organized

How Well Do You Know Your Advisor?

Take the quiz!

1. Where did your advisor go for undergrad? (1 pt.)
2. Where is your advisor's home town? (1 pt.)
3. Who was your advisor's advisor (your grandadvisor)? (1 pt.)
4. How many siblings does he/she have, and what are their professions? (1 pt.)
5. What is your advisor's middle name? (1 pt.)

Your Score:

- 4-5 - You know WAY too much about your Advisor.
- 2-3 - You Google-stalked him, didn't you?
- 0-1 - You have a normal relationship with your Advisor.

YOUR THESIS COMMITTEE

Also known as: an impossibly difficult group to get together in one room but who nevertheless hold your future in their hands depending on their ability to reach a civilized consensus.

Your Professor

Simultaneously your biggest ally and your worst enemy. Will be the first to suggest you do more work.

The Guru

Only here for the free cookies. Don't forget to bring cookies.

The ~~Asshole~~ Adversary

Has bitter rivalry with your Professor and will argue the exact opposite view. Work this to your advantage.

The Strawman/woman

Nice guy.
No opinions.

The Assistant Professor

Still doesn't believe just a few months ago they were on the other side just like you. Pretends to be an adult.

NONE OF THEM WILL ACTUALLY READ YOUR ENTIRE THESIS.

Which is which? Research or Design?

Research Methods for Graduate Students

Any Questions? Comments?

-End of Presentation-

Thank you for your attention!

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3. **The Research Adviser** – ***[Prof. Smith]***, *Jorge Cham, PhD Movie Downloadable Still, available online at: http://jorgecham.com/movie/photos/stills/copyrighted/smith1.jpg*

The figures presented in the first section of the presentation were taken from the reference material by Faste, et al., 2012 intended for academic purposes

NEWTON'S THREE LAWS OF GRADUATION

Though famous for his seminal work in Mechanics, Isaac Newton's theories on the prediction of a doctoral graduation formulated while still a grad student at Cambridge remain his most important contribution to academia.

FIRST LAW

"A grad student in procrastination tends to stay in procrastination unless an external force is applied to it"

This postulate is known as the "***Law of Inertia***" and was originally discovered experimentally by Galileo four years before Newton was born when he threatened to cut his grad student's funding. This resulted in a quickening of the student's research progress.

Galileo's observations were later perfected by Descartes through the application of "Weekly Meetings."

Before Galileo's time, it was wrongfully thought that grad students would rest only as long as no work was required of them and that in the absence of external forces, they would graduate by themselves.

(From Encyclopaedia Britannica)

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NEWTON'S THREE LAWS OF GRADUATION

First published in 1679, Isaac Newton's "***Procrastinare Unnaturalis Principia Mathematica***" is often considered one of the most important single works in the history of science. Its Second Law is the most powerful of the three, allowing mathematical calculation of the duration of a doctoral degree.

SECOND LAW

"The age, a, of a doctoral process is directly proportional to the flexibility, f, given by the advisor and inversely proportional to the student's motivation, m"

Mathematically, this postulate translates to:

$$age_{PhD} = \frac{flexibility}{motivation}$$

$$a = F / m$$

$$\therefore F = m\,a$$

This Law is a quantitative description of the effect of the forces experienced by a grad student. A highly motivated student may still remain in grad school given enough flexibility. As motivation goes to zero, the duration of the PhD goes to infinity.

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NEWTON'S THREE LAWS OF GRADUATION

Having postulated the first two Laws of Graduation, Isaac Newton the grad student was still perplexed by this paradox: If indeed the first two Laws accounted for the forces which delayed graduation, why doesn't explicit awareness of these forces allow a grad student to graduate?

It is believed that Newton practically abandoned his graduate research in Celestial Mechanics to pursue this paradox and develop his Third Law.

THIRD LAW

"For every action towards graduation there is an equal and opposite distraction"

This Law states that, regardless of the nature of the interaction with the advisor, every force for productivity acting on a grad student is accompanied by an equal and opposing useless activity such that the net advancement in thesis progress is zero.

Newton's Laws of Graduation were ultimately shown to be an approximation of the more complete description of Graduation Mechanics given by Einstein's Special Theory of Research Inactivity.

Einstein's theory, developed during his graduate work in Zurich, explains the general phenomena that, relative to the grad student, time slows down to nearly a standstill.

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Activity

-Sharing your ‘INSIGHTS’ on ‘DESIGN RESEARCH’-
and
-Situating your research question on to which kind of design research activity it is-